

REMARKS

I. Status of the Application

Claims 1-2 are pending in the application. None of the claims have been cancelled.

In the Office Action, the Examiner rejected claim 1 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,811,903 to Ueno et al. ("Ueno") in view of U.S. Patent No. 931,069 to Larabee ("Larabee"). Claims 1-2 are being rejected under 35 U.S.C. §103(a) as unpatentable over Ueno in view of U.S. Patent No. 6,317,287 to Yano et al. ("Yano"). Claim 1 is being rejected under 35 U.S.C. §103(a) as unpatentable over Ueno in view of U.S. Patent Application Publication No. 2005/0115350 to Ohashi et al. ("Ohashi"). Claims 1-2 are being rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,608,416 to Nishimura ("Nishimura") in view of U.S. Patent No. 6,076,266 to Beckingham ("Beckingham"). Claims 1-2 are being rejected under 35 U.S.C. §103(a) as unpatentable over Nishimura in view of Ohashi.

In view of the Amendments and Remarks herein, Applicants believe the present application is in condition for allowance and respectfully request notice of same.

II. Rejections

Initially, it should be noted that the present invention relates to a stepping motor having thrust mechanism comprised of a resilient member (26) and a point-contact member (27) disposed in the lead screw portion end of a rotary shaft. By this response, claim 1 has been amended to further include that the rotary shaft includes a metal pipe having its inner and outer surfaces continuously covered by a synthetic resin to form the lead screw portion of the rotary shaft, wherein the metal pipe is filled with the resin which does not reach the distal end of the pipe, thereby forming a recess in the end of the metal pipe. In addition, claim 1 has been amended to include that the diameter of the point-contact member is less than the inner diameter of the pipe, such that the point-contact member is disposed on the distal end of the pipe. Thus, the thrust mechanism to give an axial thrust force to the rotary shaft is disposed out of and apart from the stator assembly having coils to radiate heat. Therefore, the relevant components of the thrust mechanism are kept free from influences of the heat radiated from the coils. Support for these amendments can be found in the specification, including at page 7 and FIG. 3. As will be

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discussed, none of the cited references, alone or in combination, teach or suggest the features of amended claim 1 or the advantages of the present invention.

In the Office Action, the Examiner rejected claim 1 as being unpatentable over Ueno in view of Larabee. It is noted in the Office Action that “Ueno does not teach that the thrust mechanism (thrust bearing) 5 has ‘a resilient member provided in [the] recess,’ such that point-contact member (i.e., the ball of thrust bearing 5) is ‘provided between the resilient member and one bearing of the respective bearings . . . wherein thrust force is given by the resilient member to the rotary shaft in an axial direction.” Larabee is then added for the premise that it “would be obvious to modify Ueno’s bearing and provide a resilient member in a recess of the shaft of Larabee since this would have provided a comparatively frictionless, durable and free-running bearing.” (Office Action, p. 3).

The “resilient member” referred to in Larabee, however, is a “block or facing member 5 of hard rubber . . . inserted in a cavity formed in the end of the shaft, and preferably projects slightly there from at its end.” (Larabee, p. 1, lines 53-58). “Resilient” typically means something that is “bouncy” or “elastic” with the ability to spring back. The “resilient member” of the present invention is a coil spring provided within the distal end of the metal pipe, which would have the defined “resilient” characteristics. A “hard rubber block” would not have these characteristics, nor would it be equated with a coil spring. Therefore, Applicants respectfully submit that one skilled in the art would not consider replacing the coil spring of the present invention with a “hard rubber block,” which also projects from the end of the shaft (not contained within the shaft), as described in Larabee. Furthermore, neither Ueno nor Larabee teach or suggest the remaining features of amended claim 1.

Claims 1-2 stand rejected as being unpatentable over Ueno in view of Yano. In the Office Action it is stated that “[i]t would have been obvious to modify Ueno and provide a resilient member in the recess of the lead screw per Yano since the resilient member would have preloaded the lead screw and canceled backlash.” (Office Action, p. 4).

Applicants respectfully submit that the Examiner could only have arrived at a conclusion of obviousness through hindsight analysis by reading Applicants’ own inventive teaching and by selecting those elements from Ueno and Yano that are deemed relevant to the teachings of the

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present invention. Such decomposition of an invention “into its constituent elements, finding each element in the prior art, and then claiming that it is easy to reassemble these elements into the invention, is a forbidden *ex post* analysis.” *In re Mahurkar Patent Litigation*, 831 F.Supp. 1354, 1374, 28 U.S.P.Q. 2d 1801, 1817 (N.D. Ill. 1993). The Federal Circuit has specifically noted:

[I]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious . . . [o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

In re Fritch, 972 F.2d 1260, 1266, 23 U.S.P.Q. 2d 1780, 1784 (Fed. Cir. 1992).

Unless the references suggest the particular combination of elements themselves, they cannot show the actual invention was obvious. *In re Mahurkar Patent Litigation*, 831 F.Supp. 1354, 1374, 28 U.S.P.Q. 2d 1801, 1817 (N.D. Ill. 1993). In other words, it is impermissible for the Examiner to select certain elements of one reference and ignore the structural teachings of the other reference. In Yano, the resilient member (compression spring) 9 is provided in the recess 5c inside the stator, including the coil and the permanent magnet 7, and therefore is subject to a heat generated by the coil 8. Thus, the thrust force of resilient member 9 can be affected by heat, which is not desirable. The present invention specifically teaches that the thrust mechanism, which gives an axial force to the rotary shaft, is disposed out of and apart from the stator assembly having coils that radiate heat, so that the thrust mechanism is kept free from the influences of the heat radiated by the coils (See specification, pages 5-6). Modifying Ueno with the teaching of Yano would not result in the structure taught and claimed in the present invention. Therefore, it would not be obvious to modify Ueno per Yano as suggested in the Office Action. Furthermore, neither reference, alone or in combination, teach or suggest the features of claims 1 and 2.

Claim 1 is being rejected as unpatentable over Ueno in view of Ohashi. As noted, Ueno lacks the thrust mechanism, and thus, Ohashi is being added for the premise that “[i]t would have been obvious to modify Ueno and provide a resilient member per Ohashi to provide a stable thrust force to the shaft and ease backlash.” (Office Action, p. 5).

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However, the same argument presented above for the combination of Ueno and Yano applies to the combination of Ueno and Ohashi. In the structure of Ohashi, the helical compression spring 51 is disposed between the base 14d of the cylindrical recess 14c formed in the armature shaft 14 and the end face 52a of the back end portion of the slide member (p. 4, [0044], FIG. 2). The positioning of the compression spring 51, which, in the Office Action, is equated with the resilient member of the present invention, locates the compression spring within the vicinity of the armature coil 16c of the motor. In this position, it is evident that the thrust mechanism generated by the coil will be subjected to and influenced by the heat generated by the coil 16c, which is the same problem discussed above for Yano. Therefore, for the reasons given previously, that given the structural features of Ueno and Ohashi, it would not be appropriate or obvious to combine these references to arrive at the present invention. Furthermore, it is impermissible to find obviousness through hindsight analysis by reading Applicants' own inventive teaching and then selecting those elements from Ueno and Ohashi that are deemed relevant to the teachings of the present invention to find the present invention obvious.

Claims 1 and 2 are being rejected as unpatentable over Nishimura in view of Beckingham. It is noted in the Office Action that Nishimura does not teach a thrust mechanism having a resilient member and a point contact member, as taught and claimed in the present invention (Office Action, p. 5). Thus, it is stated "[i]t would have been obvious to modify Nishimura and provide a resilient member in the recess of the worm shaft per Beckingham since this would have provided a biasing force for returning the shaft." (Office Action, p. 6).

Nishimura relates to a small-sized motor which requires high dimensional and rotational accuracy. It should be noted that the discussion of Nishimura in the Office Action all relates to the prior art (FIG. 4), and not to the teaching of Nishimura itself. Regardless, Applicants respectfully submit that it would not be obvious to combine the teaching of Beckingham with Nishimura to arrive the thrust mechanism and other features of amended claim 1.

Beckingham relates to a theodolite not a motor. Thus, while Beckingham discloses a ball bearing 156 coupled to a spring 158, which provides a biasing force for returning the worm shaft 106 and pin 116, it would not be obvious to one skilled in the art to look to the teaching of a theodolite, which has no relationship to a motor.

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Referring to FIG. 1, Nishimura describes a “bearing 31 has a recess for receiving one end portion of an output shaft 26, and has a semispherical recess for receiving an approximately half of a steel ball 32 in a bottom of this recess.” (col. 5, lines 4-7). There is no thrust mechanism taught or suggested in Nishimura. Furthermore, it appears from the description of Nishimura that an “object is to provide a motor which has a motor body and a frame for holding its output shaft, and which makes it possible to obtain concentricity of the motor body and the output shaft with high accuracy and minimize the clearance between the stator and the rotor . . .” (col. 2, line 67 to col. 3, lines 1-5). Given this object of Nishimura, and the structural differences between Nishimura and Beckingham, it does not follow that one skilled in the art would look to Beckingham to modify Nishimura with a biasing force to return the shaft, as this does not appear to be a necessary feature of Nishimura. Again, it is impermissible to take the “choice features” of certain references, while ignoring their structural differences, to arrive at a conclusion that the subject invention is obvious. Even if these references were properly combined, they do not arrive at the present invention recited in amended claim 1.

Claims 1 and 2 are being rejected as unpatentable over Nishimura in view of Ohashi. It is stated in the Office Action that “[i]t would have been obvious to modify Nishimura and provide a resilient member per Ohashi to provide a stable thrust force to the shaft and ease the backlash.” (Office Action, p. 7). Applicants respectfully disagree that their invention is obvious in view of the combination of these references.

These references have been discussed in light of the present invention. As previously noted, Nishimura does not teach a thrust mechanism, and given the teaching of Nishimura, it does not appear that adding the structure of Ohashi would be feasible. Furthermore, the disadvantages of the structure of Ohashi were previously described. Thus, Applicants respectfully submit that given the previous discussions, these references, alone or in combination, do not arrive at the features in amended claim 1.

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CONCLUSION

In light of the foregoing reasons, Applicants respectfully request reconsideration and allowance of claims 1-2. The Commissioner is authorized to charge any additional fees or credit any overpayments associated with this Amendment to Deposit Account 13-0206. Applicants further invite the Examiner to contact the undersigned representative at the telephone number below to discuss any matters pertaining to the present Application.

Respectfully submitted,

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By: Monique A. Morneault

Monique A. Morneault, Reg. No. 37,893
Customer No. 1923
McDermott Will & Emery, LLP
227 West Monroe Street
Chicago, Illinois 60606-5096
(312) 372-2000
Attorneys for Applicant

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Sarah J. Goodnight
Sarah J. Goodnight

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